CASE

OF

OBSTRUCTED AORTA.

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COMMUNICATED BY

SIR GILBERT BLANE, BART.

Read July 19, 1813.

THE case which I take the liberty of transmitting to the Medical and Chirurgical Society, has, as far as I know but one parallel on record, and in it the appearances on dissection only are mentioned. No history is given of the case. I believe I have extracted from the books of the Infirmary, such parts of the reports taken at the patient's bedside as are of any importance, and have even noted some anomalous symptoms which may appear trifling, because it may perhaps be found that an improved state of knowledge may give importance to what at present seems adventitious and without value. I am sorry to say, that, as I can see no diagnostic symptom, the occurrence of this derangement adds but another chance to our guessing wrong during life at the diseases of the heart.

Henry Frere, fourteen years of age, a weaver, admitted into the Infirmary, 3rd August 1813, when the following history of his symptoms was entered on the journal of the house.

"Two weeks ago, after exposure to cold, was affected with dry cough, which for the last eight days has been attended with pretty copious expectoration, and pain impeding respiration, and excited by the cough in the left side of the chest, p. 100, pretty firm. Little appetite. Much thirst. Tongue rather white. Bowels regular. Sleeps ill. Sweats a good deal. Has used no medicines."

The disease was looked upon as a case of pneumonia, but of such standing that suppuration seemed to have taken place, and in which therefore no material benefit was likely to result from any treatment. However, under the ordinary means, bleeding, blistering, expectorants, and the free use of cathartics, I had the satisfaction of seeing the symptoms decline. The blood from the first bleeding was somewhat buffy. The pulse, however, generally ranged from ninety-two to one hundred and four, and is variously marked in the reports, full, strong, sharp: it was always regular. The *sputum* became more copious, gross, and tinged with blood. He perspired chiefly on the upper parts of the body, moaned in his sleep, took little food. On the 8th, he was affected with nausea and vomiting. On the 19th, he had a febrile at-

tack, which lasted a few days. On the 20th there was much pain in the left eyeball. On the 27th he complained only of palpitation, the first time that symptom is noticed in the journal, though I rather think this was an oversight. No report was taken from this date till the 6th of October, when he was dismissed from the hospital, "cured."

The palpitation had subsided as the strength increased, which encouraged a hope I was willing to entertain, that that symptom proceeded from weakness, though I could not but express fears that the inflammation had extended to the pericardium or heart. The uncertainty of the *diagnosis* in cases of this kind, is but too well known to every practitioner. I was inclined to suspect the effusion of serum within the pericardium, or perhaps adhesion of the heart to its capsule, though I had seen at least two cases about that time of the most intimate and general adhesion, without the circulation having been in any degree affected.

These fears were much strengthened by the boy's appearance on returning to the hospital, on the 13th November, when the throbbing of the carotid and subclavian arteries was very remarkable. On his readmission, the following report appears on the journal:

"13th November, dyspnœa, palpitation at the heart, and pain in the left side of the thorax re-

turned soon after he left the house, and have been gradually increasing. P. 88, regular. Appetite pretty good. Considerable thirst. Bowels kept open by physic. Received temporary relief from the application of a blister."

Blisters and cathartics were again employed, and the symptoms for a time declined. The pain which had been removed, returned to the left side of the chest, on the evening of the 29th. A blister was repeated next day which gave much pain, till he was suddenly seized with a febrile attack on the 2d December, when the part became quite easy. There was no strangury. The fever was gone next day. A similar attack, accompanied with nausea and vomiting, was experienced on the 12th, and immediately removed by the operation of an emetic. He had acidity at stomach and cardialgia after meals. On the 23d he is reported as having been affected for ten days with pain in the right side of the chest, increased by motion, and by full inspiration; and by frequent cough, most troublesome in the night. The pulse had again risen. He was blistered, used cathartics, and was twice bled, the blood, especially after the first operation, being very buffy. The pulse came down, and the pain was removed, but the cough and palpitation continued. The circulation was again quickened on the 27th, and remained hurried till his death: he sunk in strength; was drenched in perspiration; took no food; was at-

tacked with frequent vomiting; the urine became scanty; his sleep was disturbed; the dyspnœa and palpitation increased; and he expired about noon on the 2d of January. The pulse, while he was last in the hospital, fluctuated from ninety to one hundred and sixteen, and was of various degrees of strength and firmness; latterly only, weak: it was always regular.

Dissection.

There was nearly a pound of serum in the cavity of the abdomen, and the bowels were distended with flatus, but the viscera seemed natural. Immediately on turning up the sternum, the pericardium presented itself, very much enlarged, obscuring the left lung, and adhering to the *pleura costalis.* This capsule, which was thin and beautifully transparent, contained about an ounce of fluid, and a heart nearly twice the natural size, for a boy of this subject's age. The arteries and trachea were divided above the arch of the aorta, the contents of the thorax torn downwards, and the aorta being divided below, the whole was removed from the body. The walls of the left ventricle were about an inch in thickness, but no other derangement in the structure of the heart, or its valves, was observed. The capacity of the cavities seemed natural. The aorta expanded unusually near its origin, so as to form a kind of pouch, but after giving off the branches to the head and superior ex-

tremities, its diameter was preternaturally contracted. It was continued of this diminished size, till after its union with the *canalis arteriosus*, where it was completely impervious. The coats were not thickened, or in any way diseased, except that about half an inch below the stricture, there was a smooth elevation on the inner surface, less raised, but having nearly the diameter of a split pea; otherwise the appearance was exactly such as if a ligature had been tied tightly round the artery. It is faithfully represented in the drawings.—The obstruction was about a line in breadth. The artery then received three trunks about the size of crow quills, and near them three smaller ones, afterwards resuming its natural size along the *vertebræ*. These three trunks are evidently the uppermost of the inferior intercostals. Their coats were remarkably thin, like those of veins. A probe passed from the pulmonary artery along the *canalis arteriosus*, to the obstructed portion of the aorta, but from its thickened appearance it did not seem probable much communication by means of it could have been allowed, and the florid countenance of the boy during life establishes the same conclusion. There having been no suspicion of this singular deviation from the natural structure, till after the contents of the thorax were removed from the body, it was impossible to trace with the accuracy that could be wished, the anastomosing branches by which the circulation had been carried on in the inferior parts of the body; but I

think enough has been observed to lead us very near the truth. The *arteria innominata*, the left subclavian, the superior intercostals, and the mammary arteries were much enlarged. The epigastric was reported of its natural size*. These facts, and the aorta acquiring at least very nearly its natural size immediately below the stricture†, shew that the blood did not pass to the inferior extremities, in any material quantity, as might perhaps have been expected, by the inosculations of the mammary and epigastric arteries, but chiefly by the communications of the superior intercostals

* I regret that having been obliged to leave the hospital immediately after the visit, I was not present at the inspection of the body, but the authority of the report sustains no loss by having been left to the intelligence and zeal of Messrs. Rainy, Wilson, and M'Kenzie, the resident clerks to the house, who performed the dissection. Except the epigastric artery, which it was not thought necessary to preserve, I have since repeatedly examined all the parts connected with the circulation. The whole are now beautifully preserved in the Museum of my friends Drs. Robertson and Monteath. The greatest external circumference of the aorta, near its origin, measured 3.8 inches. The left subclavian 1.3 inch. The aorta immediately after the left subclavian was given off 0.8 of an inch; and immediately below the stricture 1.6 inch.

† Dr. Monteath doubts whether the abdominal aorta is quite as large as natural. The branches given out by it were unfortunately cut off so short, that the tying of them in order to inject the portion of the artery preserved has necessarily lessened its diameter, and to this I am inclined to attribute the whole of the diminution. The measurements I have given were made before injecting and will enable any one to determine the question by comparison with other cases.

and the mammary arteries, with the three large branches entering the aorta below the stricture: also from the mammaries and thoracics through others of the intercostal and diaphragmatic arteries.

The lungs were very light coloured; the left lobe much collapsed. In each side of the thorax there was a small quantity of bloody serum.

Remarks.

The first question that naturally arises on reading the account of the dissection, is to ascertain whether this uncommon appearance of the aorta was a congenital formation, or the result of diseased action. On the first inspection of the parts, I was led, from the limber and healthy appearance of the coats at the stricture, to believe that the appearance was a connate *lusus naturæ*, and thought to get some information from the boy's friends, of his state, especially during infancy, with a view to decide this. I have been disappointed, however, in every inquiry I have made. He had only been in Scotland five weeks before he came under my care, and I have been able to procure but imperfect information. No one knows any thing about him previous to the time he came to Glasgow. At that time, I am told, he seemed free from complaint, was active, and without dyspnœa, or any apparent uneasiness, at his sports. He was stoutly made, particularly about the chest. He was also

well limbed. He had a fair complexion and dark brown hair. The presumption, therefore, is that there was no original derangement in the arterial system, and a careful inspection of the parts, an attentive consideration of the case, and reflection on similar and analogous instances, will present a view which gives much countenance to the opinion of the blood having but recently been diverted from the natural channel.

I believe it is found, that in the deviations of nature from the ordinary structure, she seldom destroys the function of an organ without enabling another to carry it on, and in many instances with little imperfection. I mean, of course, to except those monsters in which she disregards all rule, and which cannot live after birth. In this case, however, although there was never any deficiency of blood circulated in the lower extremities, yet the enlarged and thickened heart, and the increased diameter of the aorta at its origin, seemed to shew that there had been much resistance to the transit of that fluid; also that vessels of sufficient diameter readily to supply the place of the aorta, had not been originally furnished by nature*.

* I know that the heart is frequently much enlarged and thickened without any difficulty to the transmission of the blood; but this is a disease of much slower progress. Within these two days, I have seen such a case terminate fatally with symptoms wonderfully similar to those of Frere. There were the same palpitations and throbbing in the neck; the same rapid pulse, for the most

And does not the thinness of the coats of the enlarged intercostal arteries, shew that they have been under the influence of distension from preternatural impulse? It may be presumed, that if this had existed as a mal-conformation from infancy, the vessels would have long before recovered their natural structure. Nor indeed is it in infancy only, that attempts must have been made to repair this imperfection, for, if it had been a *lusus naturæ*, it must, even *in utero*, have opposed a barrier to the circulation of the whole mass of blood, as it was placed below the *canalis arteriosus*.

I think it a subject even of some practical importance to determine this point. If we find that the structure is the consequence of disease, we add, in the first place, another case to prove, that even where the great artery of the body is obliterated, there is no risk from defective circulation

most part sharp and regular; the same repeated attacks of fever and pain of chest requiring venæsection and the other branches of the antiphlogistic regimen; the same accessions of nausea and vomiting. Dissection shewed general and firm adhesions of lungs, otherwise healthy, to every thing in contact with them, and a monstrously enlarged heart, everywhere firmly united to a thickened pericardium, except at a small spot near the apex. The walls of all the cavities, particularly of the ventricles, were very much thickened, those of the left ventricle measuring more than an inch. The capacity of the auricles only was enlarged, but that greatly. Polypi were contained in several of the cavities, but having the appearance of those formed after death. The disease was of five years standing: the subject, a girl of about seventeen years of age.

in the parts below, and therefore the surgeon may be emboldened to tie any artery within reach of his knife, without fear about the transmission of the blood; and, secondly, we are taught that there may exist in the arterial system, or part of it, a disease having this effect, and yet compatible with life.

I. The first point has, I think, been long since established. There are several cases on record, of obstructions, from various states of disease, in different parts of the aorta, which must have admitted the passage of at most only a very small quantity of blood: as that related by Stenzel, (Dissertatio de steatomatibus aortæ;) two cases by Mekel, (Mem. de l'Acad. R. de Berlin, 1756;) that by Stoerk, (Ann. Med. II. p. 171.) Mr. Cooper tied the abdominal aorta of a dog, without material detriment to the circulation, (Medico-Chirurgical Transactions, Vol. II. p. 258.) In the Museum belonging to Messrs. Pattison and Russel, there is a preparation where the aorta is plugged up, by a laminated coagulum, just above the bifurcation of the iliacs, into both of which this substance extends. It is impossible to say from inspecting the preparation, whether the recent artery were absolutely impervious; and unfortunately, though Mr. Pattison at my request has kindly examined the papers of the late Mr. Allan Burns, to whom the preparation belonged, he has been unable to find any account of the case. The case which

most nearly resembles that of Frere, is one which occurred in the Hotel Dieu. The appearances on dissection are detailed by M. Paris, in Desault's Surgical Journal. The artery was not in it quite closed, and as the state of the heart is not mentioned, it ought perhaps to be presumed natural, otherwise there is no material difference in the cases. The identity of the site of the stricture is deserving of notice, lest after examples should prove a peculiar tendency towards its formation in this portion of the vessel. Analogy is in favour of such a supposition, definite portions of continuous and similar structures, being in many instances liable to particular diseases. It is a matter of great regret, that in the case of M. Paris, no account whatever is given of the symptoms that occurred during life. It is indeed difficult to say why morbid appearances are recorded at all, where there is no previous history, as they can be productive of little or no instruction.

II. When it was believed essential to the production of adhesive inflammation within an artery, to retain the sides in contact, it must have been very difficult to believe, that obliteration of the aorta by its means, could take place where there was evidently no pressure applied to the artery; but we now know that a vessel may be converted into a ligamentous cord, by an injury which does not at the moment interrupt the circulation through it. This is proved by Morand's case (Mem. de

l'Acad. R. de Paris, an. 1736), where the artery was closed by a violent contusion; and still more unequivocally by Jones's experiments (Jones on Hæmorrhage). The Society will recollect instances on record, though I cannot at the moment refer to them, where on dissection both arteries and veins have been found obliterated without any evident cause. It seems likely, that, in such cases, the obstruction had arisen from the same modification of diseased action as occurred in Paris's case, and in my own; but the vessels being only of secondary importance, their loss did not destroy life. The obliteration was of small extent in the case I have related, which is to me a convincing proof that it was recent. Though ultimately obstruction to the flow of blood through an artery, causes it to close as far as the next anastomosing branch, yet this is comparatively a slow process, and not effected till after the vessel is shut at the diseased point. It will easily be believed, therefore, that in this case the narrowed diameter of the trunk of the aorta, from the left subclavian to the stricture, was a stage in its progress to complete obliteration, arrested only by the death of the boy. And though there is every reason to believe that this morbid affection was *recent*, it seems equally evident, that it could not have been *sudden*. The increased muscular substance of the heart, as well as the enlargement of the aorta, must have been a work of time. And the existence of life under so great an interruption to the vital ope-

rations, may be considered as a proof and example among many others of the wonderful power of nature in accommodating herself to the greatest changes in the most essential organs of life, provided such changes are slow and gradual, and provided the action of the organs is not hurried, disturbed, or over-excited. The disturbance in this case consisted in the accidental catching of cold, producing catarrhal fever. The practical inferences from this are obvious, for it is clear, that under this, and all other incurable organic læsions of vital parts, life can be protracted and suffering alleviated, only by avoiding exposure, fatigue, emotions of mind, and stimulating diet.

Glasgow,
June 27, 1814.

EXPLANATION OF THE PLATE.

Fig. I. a. The right ventricle slit open, and gaping from a piece of bougie placed in it.
b. The tricuspid valve, with the opening from the auricle.
c. Part of the right auricle.
d. The dilated portion of the aorta.
e. The enlarged arteria innominata, puckered from a ligature having been passed round it when the vessel was injected.
f. The left carotid, of its natural size.
g. The left subclavian greatly enlarged, immediately below which the aorta is seen much contracted, as far as
h. Where it is impervious.
i. The canalis arteriosus.
j. The pulmonary artery.
k. Part of the left auricle.
l. The left ventricle.
m. n. o. The enlarged intercostals entering the aorta below the stricture.
p. q. r. Three smaller vessels torn off short.

Fig. II. Shews the opposite side of the preparation.
a. The right auricle, with its opening into
b. The right ventricle.
c. The left auricle. A portion of each auricle is cut away, and in the parti-

tion between them is seen, at d. the site of the foramen ovale.

e. The pulmonary artery tied just beyond its division.

f. The canalis arteriosus.

g. An incision into the aorta from the stricture to the second pair of intercostals, one of which that is not materially enlarged, it enters. The incision is kept open by a piece of whalebone, which passes through the sides of the vessel. Three pairs of intercostals, of about the natural size, but torn off short, are seen lower down.

h. The left ventricle, with its thickened walls cut open, and held aside by a bougie.

Fig. III. A portion of the mammary artery after injection, merely to shew the increase of its size.

Fig. 1.

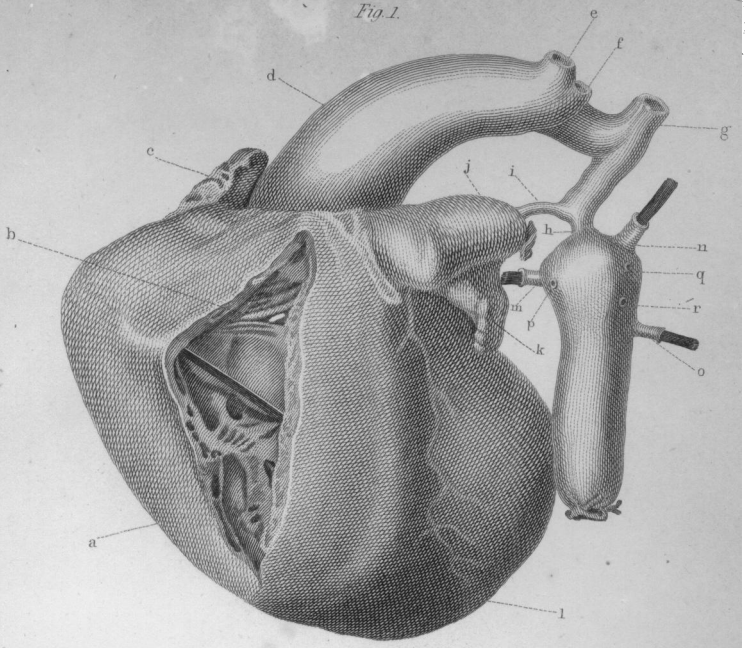


Fig. 2.

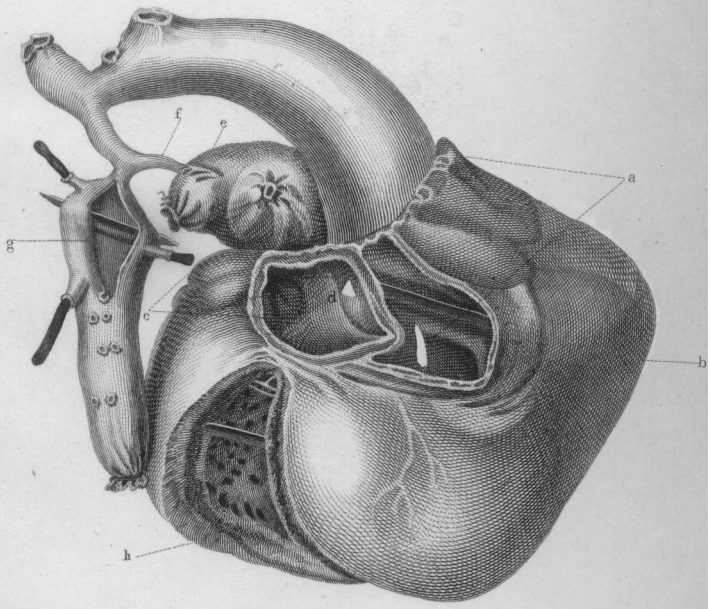
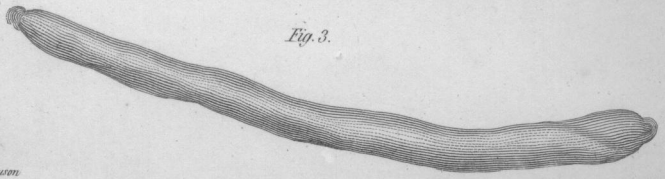


Fig. 3.



Drawn by W. Ferguson.

Engraved by J. Stewart